

101586665

RECEIVED 20 JUL 2006

May 26, 2005

The International Bureau of WIPO
34 Chemin des Colombettes
1211 Geneva 20,
Switzerland

“Amendment of the claims under Articles 19(1) (Rule 46)”

Re: International Application No. PCT/JP2005/000047
Applicant: HITACHI MEDICAL CORPORATION
Agent: Katsuo Ogawa
International Filing Date: 06.01.2005

Dear Sir.

The applicant, who received the International Search report relating to the above identified International Application transmitted on 29.3.2005, hereby files amendment under Article 19(1) as in attached sheets.

Further, the applicant hereby replaces sheets Nos. 20 and 21 as attached. Thus claims 1 - 6 are retained unchanged, claims 4 - 5 are amended and claim 6 is canceled.

The applicant also files as attached herewith a brief statement explaining the amendment and indicating any impact that amendment therein might have on the description and drawings.

Very truly yours,

Katsuo Ogawa

Attachment:

(1) Amendment under Article 19(1)	2 sheets
(2) Brief statement	1 sheet

AMENDMENT UNDER ARTICLE 19(1)

Claims

1. An ultrasonic imaging system that transmits/receiving an ultrasonic pulse to/from a living body having contrast-imaging microbubbles introduced therein, and forms an image of the living body, the ultrasonic imaging system being constructed such that when N is taken as an integer of 3 or more, by repeating the transmitting/receiving operations the N number of times using the transmitted pulse waves each of a different waveform under the same transmitting/receiving focus conditions, the ultrasonic imaging system suppresses pulse transmitting/receiving sensitivity with respect to components ranging from a fundamental wave component of an ultrasonic echo signal derived from an internal soft tissue of the living body, to $(N-1)$ th-order harmonic component of the ultrasonic echo signal, and thus obtains appropriate pulse transmitting/receiving sensitivity with respect to an ultrasonic echo signal derived from the contrast-imaging microbubbles, wherein:

the system includes a pulse-transmitting amplifier for transmitting the pulse waves to the inside of the living body; and

an input cycle time of a signal applied to the pulse-transmitting amplifier is an integer-multiple of N with respect to a maximum frequency of frequency components of the transmitted pulse.

2. The system ultrasonic imaging according to claim 1,

further comprising a D/A converter to apply the signal to the pulse-transmitting amplifier, wherein a signal output cycle time of the D/A converter is an integer-multiple of N with respect to the maximum frequency of the frequency components of the transmitted pulse.

3. An ultrasonic imaging system that transmits/receiving an ultrasonic pulse to/from a living body having contrast-imaging microbubbles introduced therein, and forms an image of the living body, the ultrasonic imaging system being constructed such that when N is taken as an integer of 3 or more, by repeating the transmitting/receiving operations the N number of times using the transmitted pulse waves each of a different waveform under the same transmitting/receiving focus conditions, the ultrasonic imaging system suppresses pulse transmitting/receiving sensitivity with respect to components ranging from a fundamental wave component of an ultrasonic echo signal derived from an internal soft tissue of the living body, to $(N-1)$ th-order harmonic component of the ultrasonic echo signal, and thus obtains appropriate pulse transmitting/receiving sensitivity with respect to an ultrasonic echo signal derived from the contrast-imaging microbubbles, wherein the transmitted pulse wave has a waveform formed by summing a fundamental wave and second-order harmonics associated with the fundamental wave.

4. An ultrasonic imaging system that transmits/receives an ultrasonic pulse to/from a living body having contrast-imaging microbubbles introduced therein, and forms an image of the inside of the living body, the ultrasonic imaging system providing:

a first imaging sequence in which, by repeating the pulse transmitting/receiving operations three times using the transmitted pulse waves each of a different waveform under the same transmitting/receiving focus conditions, the ultrasonic imaging system suppresses pulse transmitting/receiving sensitivity with respect to components ranging from a fundamental wave component of an ultrasonic echo signal derived from a soft tissue of the living body, to second-order harmonic component of the echo signal, and selectively obtains pulse transmitting/receiving sensitivity with respect to an ultrasonic echo signal derived from the contrast-imaging microbubbles; and

a second imaging sequence in which, by repeating the transmitting/receiving operations twice using the transmitted pulse waves each of a different waveform under the same transmitting/receiving focus conditions as the conditions used in the first imaging sequence, the ultrasonic imaging system suppresses pulse transmitting/receiving sensitivity with respect to a fundamental wave component of an ultrasonic echo signal from the soft tissue of the living body, and selectively obtains pulse transmitting/receiving sensitivity with respect to a second-order or subsequent nonlinear signal components;

wherein imaging is implemented using the two sequences selectively as appropriate, and transmission amplitude in the first imaging sequence is greater than transmission amplitude in the second imaging sequence.

5. The ultrasonic imaging system according to claim 4, wherein a maximum value of the transmission amplitude in the first imaging sequence is about 0.1 MPa and a maximum value

of the transmission amplitude in the second imaging sequence
is less than 0.1 MPa.

6. (Cancelled)

条約第 19 条（1）に基づく説明書

請求の範囲第 1 項から第 3 項は、国際調査機関の見解書において新規性および進歩性有と評価され、請求の範囲第 4 項から第 6 項は、国際調査機関の見解書において新規性有、進歩性無しと評価された。従って、請求の範囲第 4 項および第 5 項は訂正し、第 6 項は削除する。

請求の範囲第 4 項の訂正された内容は、明細書の記載に明らかであり、第 5 項の訂正された内容は、明細書に明文の記載がないが、図 19（b）の内容から明確に理解できる。

請求の範囲第 4 項の訂正された内容は、文献 1 とは明確に異なり、連続する撮像シーケンスの送信振幅が異なることは、文献 1、文献 2 の組み合わせを考えても、示唆されるものではない。

Brief Statement

Claims 1 - 3 have been estimated to have novelty and inventive step in the written opinion prepared by the international searching authority. Claims 4 - 6 have been estimated to have novelty but not have inventive step in the same written opinion. Therefore, Claims 4, 5 are to be corrected and claim 6 is to be cancelled.

Contents corrected for Claim 4 are apparent from the description given in the specification. Although contents corrected for Claim 5 are not described in any sentences of the specification, they can clearly be understood from contents illustrated in Fig. 19(b).

Contents corrected for Claim 4 are quite different from those of Reference 1, in which the fact that the transmit amplitude in the continuous imaging sequence is different is not suggested even if References 1 and 2 are combined.